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ABSTRACT

More than 7 million workers in the United States today use computer-based video display terminals to do word and data processing; an overwhelming number of these workers are women. Women make up most of the occupational groups identified as "administrative support," and they are particularly affected by the changes taking place in the workplace. The impact of new office technologies on clerical work is a subject of great concern to the Women's Bureau of the U.S. Department of Labor. This concern extends to a wide variety of issues posed by the electronic office, including the following: (1) quality and content of the new jobs; (2) wages and status; (3) opportunities for mobility; (4) training and retraining; (5) health and safety factors; (6) equal opportunity aspects; (7) electronic "telework" and remote office work; and (8) the quantity of jobs or clerical employment prospects. Current research suggests that clerical workers often are excluded from the planning and implementation decisions leading to technological change. Although office automation promises greater efficiency and productivity, decision makers should remember that these outcomes are not independent of the people who operate the new equipment. (KC)

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Women and Office Automation: Issues for the Decade Ahead

U.S. Department of Labor
Office of the Secretary
Women's Bureau

1985

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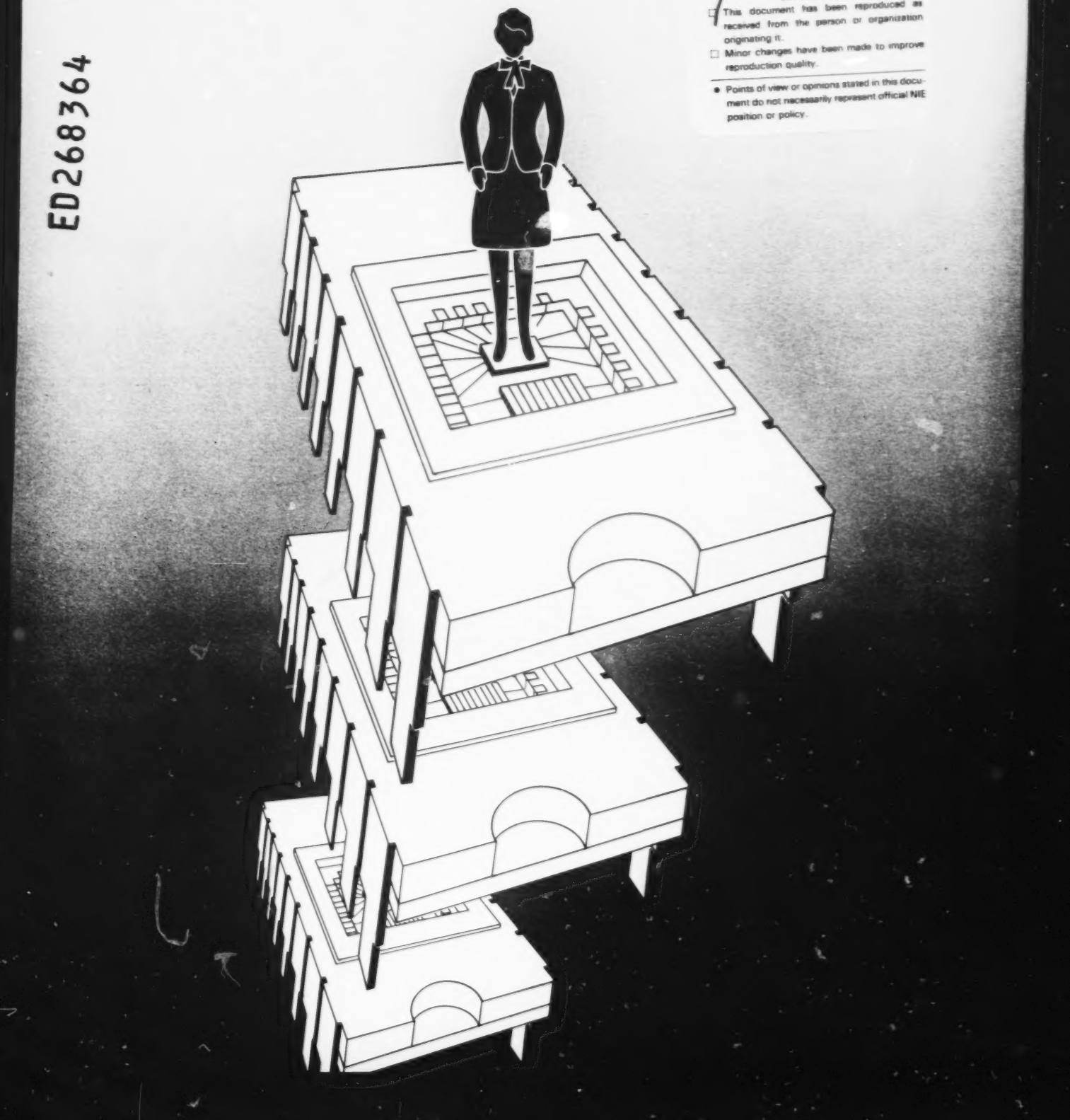

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Women and Office Automation: Issues for the Decade Ahead

U.S. Department of Labor
William E. Brock, Secretary

Women's Bureau
Lenora Cole Alexander, Director

1985

U.S. DEPARTMENT OF LABOR

SECRETARY OF LABOR
WASHINGTON, D.C.

A MESSAGE FROM THE SECRETARY

As new technology moves into the workplaces of this Nation at a rapid pace, it presents challenges in the way managers and workers adjust to their new environment. Office clerical workers are particularly affected by the automation that forges ahead with developments in information processing. We know as well that if we are to strengthen our Nation's ability to compete in the world market, we must do more than develop new technologies. We must also develop the skills and knowledge required to understand, manage, and utilize those technologies to their fullest potential. Introduction of microelectronic equipment in offices is not enough. Wisdom prompts us to seek a better understanding of what the technology can do for people and to people.

There are a number of important issues that must be addressed on behalf of the nearly 17 million workers in clerical and administrative support occupations, where 80 percent of the workers are women. The Women's Bureau has identified those issues in this publication. Although continuing research is still needed in order to fully assess the impact of new technology on office workers, much is already known about some problem areas where we need to look for solutions.

Clerical and other workers can take better advantage of the challenges offered by new electronic equipment. Yet, far too many workers are not fully aware of what those advantages are. In the move to improve productivity we must make sure that workers benefit from the opportunities that technological advances provide. The total responsibility, however, is a shared one. It rests with private sector employers as well as government at all levels, with unions as well as educational institutions and community agencies. Initiatives by some of these groups are already underway. But all of us have a stake in making sure that automation enhances the quality of worklife for the women and men who work in office settings. Indeed, a progressive, productive workplace and the full and practical use of its resources benefit the entire Nation.

WILLIAM E. BROCK

FOREWORD

All of us have been touched directly or indirectly by recent technological advances which affect the way we live and work. New developments in computer-based technologies have transformed the work and workplaces of millions of Americans. As more office functions adapt to advances in data and word processing, the automation raises implications--both positive and negative--for the 13 million women in clerical and other administrative support occupations.

The impact of automation on the quality of worklife as well as on the economic well-being of clerical workers and their families is a matter of priority for the Women's Bureau--the only Federal agency devoted exclusively to the concerns of working women. Nearly a third of all employed women are in clerical and other administrative support occupations--jobs that are among those most susceptible to change. Further, many of the thousands of women who enter the labor force each year continue to view clerical work as a preferred option. It is crucial, therefore, that we understand what electronic offices mean for the women and men who work in them--what they offer workers and what they demand as well. They can and should mean increased opportunity and job satisfaction--but do they? Research studies have revealed uncertainties related to a number of issues we identify in this pamphlet. The discussions indicate how much we know, how much more we need to know, and how much we need to do to address the challenges of the decade ahead.

The Women's Bureau has undertaken a number of initiatives to gain more knowledge that we can share about the effects of technological change on women workers. This publication is one of several being developed. In addition to research studies, there will be a guide for users of electronic equipment as well as a guide for employers who introduce the equipment and implement systems. Recommendations from a panel of experts on office technology also will be forthcoming in the Bureau's series of publications.

We hope that this pamphlet which highlights issues will contribute toward a better understanding on the part of the many individuals and groups responsible for or interested in the training and employment of workers--public policymakers at all levels of government, employers, unions, educators, and others. We hope, too, that it will stimulate further research to enlarge the body of knowledge about the impact of technology on clerical and other workers. And, finally, we hope it will be a catalyst for developing practical solutions to today's problems, so that we can ensure the high quality and safety of tomorrow's jobs for workers in automated offices.

Lenora Cole Alexander

LENORA COLE ALEXANDER
Director, Women's Bureau

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Several of the Women's Bureau staff assisted in the development of this publication. Special thanks go particularly to the clerical staff who prepared the final copy of this report on word processing equipment.

CONTENTS

	Page
A Message from the Secretary	iii
Foreword	v
Acknowledgments	vi
Introduction	1
The Quality of Work	2
Workers' Satisfactions and Dissatisfactions	4
Job Design and Low Tech Clerical Work	5
Job Design and High Tech Word Processing	6
Wages and Status	7
Career Mobility	10
Training and Retraining	13
Computer Literacy	13
The Need for Relevant Training Programs	15
Where To Get Training	16
Employer-Based Programs	16
Educational Institutions	17
Proprietary Trade or Technical Schools	18
Public School Systems	18
Other Training Resources	18
Community Organizations	18
Professional Associations and Private Enterprise Consultants	19
Government/Private Sector Partnerships	19
Union-Sponsored Training Programs	19
Equal Opportunity and Technology	20
Suburban and Rural Centers	22
Offshore Clerical Work	22
Home-Based Clerical Work	23
Health and Safety	25
Visual Difficulties	26
Musculoskeletal Problems	27
Stress	27
Reproductive Hazards	28
Legislation and VDT's	29
Summary and Conclusions	30
Bibliography	37

INTRODUCTION

A century ago the telephone, electric light, and typewriter--along with rapid industrial growth--engendered historic changes in the American office. Today's workplace is again in the midst of change described variously as "office automation," "the office revolution," "the electronic office," and "the office of the future." The change is spawned by computer-based microelectronic technology and advances in telecommunications, and is embodied in the proliferation of increasingly sophisticated--and increasingly affordable--word and data processing systems.

It is estimated that more than 7 million workers in the United States today use computer-based video display terminals (VDT's) to do word and data processing. In 1984 alone, 400,000 word processing units were sold in the United States. By 1990 the number of terminals in use is expected to reach at least 40 million. One international consulting firm estimates that by 1990 "between 40 and 50 percent of all American workers will be making daily use of electronic-terminal equipment."

Women are an overwhelming majority of office workers--workers in the occupation group identified as "administrative support, including clerical" --and as such they are particularly affected by the changes taking place there. Women constituted about 80 percent of all workers in this category in 1984 (see Table 1), with an even larger representation in many of the specific occupations. For example, they accounted for 98 percent of all secretaries, stenographers, and typists; 89 percent of the information clerks; 90 percent of workers who process financial records, such as bookkeepers and billing clerks; and 93 percent of telephone operators--the largest segment of workers who operate communications equipment. Further, data for 1984 show that nearly 30 percent of the entire female work force is concentrated in administrative support positions. Virtually all of the jobs in the category deal with information processing to some extent and involve tasks that lend themselves to various levels of computerization. Virtually all of the tasks are being converted to the use of VDT's at a fairly rapid pace.

The impact of new office technologies on clerical work is a subject of great concern to the Women's Bureau. This concern extends to a wide variety of issues posed by the electronic office, including:

- quality and content of the new jobs
- wages and status
- opportunities for mobility
- training and retraining
- health and safety factors
- equal opportunity aspects
- electronic "telework" and remote office work
- the quantity of jobs or clerical employment prospects.

This pamphlet discusses these issues, except "quantity of jobs," as they affect the day-to-day worklife of clerical workers. While the outlook

for clerical employment is an important concern, the subject is not focused upon specifically in this publication. A suggested reference on prospects for clerical employment is an article, "Technology and Jobs: Office Automation," in the Occupational Outlook Quarterly, spring 1985, Bureau of Labor Statistics, U.S. Department of Labor.

Discussions on the issues which follow rely on research generated by scholars, the Government, unions, and private industry. Their research reports and other accounts of studies, which are the major resources referred to in this publication, are listed in the bibliography. It is important to note, however, that research in the area of high technology and its impact on workers is in a preliminary stage of development, and in some cases there are not enough data to fully analyze or assess an issue. Nevertheless, the available studies, including both the pros and cons expressed by researchers, provide ample information to identify issues and trends relating to clerical workers and office automation.

THE QUALITY OF WORK

Clerical jobs long have been attractive to women because they have represented clean, safe, respectable white-collar work. As women's career and employment expectations have risen, especially during the last few decades, women are increasingly judging their jobs in terms of how well paying they are, the amount of control and responsibility involved, and the extent of opportunities they offer for career advancement. Numerous studies conducted since 1975 indicate that more and more women clericals want jobs that give them more interesting and challenging work, higher wages, more respect on the job, and increased opportunity to move up in their organization.

The advent of the electronic office in this period of rising expectations challenges the quality of clerical occupations more than ever. In particular it raises questions of how computer-based office systems are affecting what clericals seek from their work. These questions generally focus on four aspects.

o In what ways is the content or nature of clerical work changing in the automated office? Are the new jobs increasing in challenge, variety, autonomy, and responsibility, or are these jobs becoming more routine and boring, more supervised and faster paced?

o What is happening to the wages of women who do word and data processing? Are they rising or falling? What skills do different kinds of computer-based clerical jobs demand? And is the relationship of wages currently paid to skills actually used an equitable one?

o Is the status of clerical work improving in the transition to the automated office? Is clerical work becoming more respected in the office hierarchy, or is it being downgraded and deskilled?

Table 1

Employment in Clerical and Other Administrative Support Occupational, 1984 Annual Averages

Selected Occupation	Total Employed	Women as Percentage of Total Employed
Total administrative support, including clerical	16,722,000	79.9
Supervisors	647,000	52.9
General office	375,000	64.8
Financial records processing	81,000	65.8
Distribution, scheduling, and adjusting clerks	149,000	22.2
Computer equipment operators	718,000	64.7
Computer operators	713,000	64.7
Secretaries, stenographers, typists	4,877,000	97.7
Secretaries	3,935,000	98.3
Stenographers	58,000	86.6
Typists	885,000	95.7
Information Clerks	1,250,000	88.9
Interviewers	181,000	86.2
Hotel clerks	74,000	71.4
Transportation ticket and reservation agents	97,000	59.9
Receptionists	665,000	96.9
Records processing occupations, except financial	847,000	82.1
Order clerks	185,000	79.0
Personnel clerks, except payroll and timekeeping	64,000	90.6
File clerks	298,000	82.6
Records clerks	146,000	81.7
Financial records processing	2,452,000	90.0
Bookkeepers, accounting, and auditing clerks	2,010,000	91.2
Payroll and timekeeping clerks	176,000	84.8
Billing clerks	146,000	87.2
Cost and rate clerks	81,000	78.1
Duplicating, mail and other office machine operators	72,000	69.8
Communications equipment operators	234,000	92.0
Telephone operators	226,000	92.8
Adjusters and investigators	685,000	70.6
Insurance adjusters, examiners, and investigators	206,000	64.1
Investigators and adjusters, except insurance	315,000	72.2
Eligibility clerks, social welfare	71,000	89.5
Bill and account collectors	93,000	65.1
Miscellaneous administrative support	2,531,000	85.1
General office clerks	664,000	80.9
Bank tellers	482,000	91.4
Data entry keyers	351,000	91.3
Statistical clerks	95,000	75.4

Source: U.S. Department of Labor, Bureau of Labor Statistics, "Employment and Earnings," January 1985.

o Will the automated office provide career mobility into management for women in the years ahead? Or will clerical workers be shunted into "low tech" job ghettos where they have less chance than ever to move up in their organizations?

Preliminary evidence suggests that office automation in and of itself is by no means a phenomenon that bodes either entirely well or entirely ill for clerical workers. Rather, the quality of the new jobs depends upon the way the jobs are designed and the extent to which managers include the concerns of clericals in the reorganization process.

Workers' Satisfactions and Dissatisfactions

Research studies indicate that secretaries and other clerical workers tend to like the new automated equipment, and are quite positive about what it can do for them. In a national survey conducted by a major vendor, some 86 percent of the secretaries questioned reported being "satisfied to very satisfied" with their automated equipment. About 9 out of 10 agreed that automated equipment made routine tasks go faster, made their jobs easier, and improved the flow of work through the office. Three-fourths or more of the secretaries agreed that the new equipment allowed them to accomplish more work each day, improved the quality of their work, and freed their time for more interesting and challenging tasks. Two other vendor-sponsored surveys and a large union-sponsored survey also found that clericals had positive attitudes toward the equipment they used. In the National Survey on Women and Stress, conducted by 9to5, National Association of Working Women, 68 percent of the respondents reported that using VDT's made their jobs more interesting and enjoyable, while fully 88 percent of the Professional Secretaries International members surveyed reported that they liked using the new automated equipment.

Clerical workers tend to see productivity gains associated with the new equipment as well. A study of State-employed VDT operators in New York found one-half to three-fourths of the female respondents reporting "a lot" to "a great deal" of productivity increases.

Problems with the quality of clerical employment in the new office nonetheless exist. They range from introducing word and data processing into offices in an insensitive manner, to practical ergonomic problems (factors pertaining to the relationship of the workers to their work environments), to the carryover of gender-based inequities from the traditional office. Although most office workers accept technological change and are quite satisfied with the new technologies available to them, they often are quite frustrated with the working conditions under which they use technologies.

Many of the concerns that workers voice about their working conditions involve practical issues related to the physical surroundings of the office. They include lack of privacy in the new "open systems" offices; lack of storage space; lack of desk top space; improper chair and desk design; noise; poor air quality; and poor equipment maintenance and backup,

especially lack of access to consultants trained to troubleshoot software and hardware problems.

Other issues, including some that have concerned clerical workers for decades, are present in the new office. These include problems with job design in certain types of clerical work, low pay and status relative to clericals' important contribution to office production, and limited opportunities for promotion to higher level jobs.

Job Design and Low Tech Clerical Work

An important issue facing clericals in the automated office involves changes in clerical job design, that is, changes in the kind of work secretaries, typists, and other clericals do. Poorly designed word and data processing jobs--sometimes called "low tech" clerical work--use computer technology to narrow the content of a job to a few simple, repetitive keyboarding procedures. Commonly these are the clerical jobs associated with centralized "transaction environments" found in the back offices of banks and financial institutions, insurance companies, utility firms, and information or form processing offices of the public sector.

These electronic back offices bear names such as "data entry operations" or "systems processing centers." The work tends to be factory-like. Scores of workers--usually women--with individual video display terminals, are lined up, row upon row, in huge windowless and fluorescent-lit rooms. Amenities, such as telephones to call home or private locked space, are few.

Supervision in back office environments usually is impersonal, with one manager overseeing a large number of operators. Rules may be rigid, such as permission required for rest breaks including bathroom privileges. Tasks are broken down into routine sequences, for example, typing series of names, account numbers, addresses. Although often monotonous, these procedures can require a great deal of concentration.

Individual performance and productivity are monitored and recorded by the computer and stored for evaluation purposes. Keystrokes, pages, lines typed, and forms or projects completed are electronically tabulated and become the measure of units per minute or units per hour produced (the so-called "work units"). These tabulations are used by managers to compare and rate an individual's overall performance and as a gauge of department or division productivity. Often they become the basis for clerical pay. In some cases they are used to set the performance standards for the next day's work. It is estimated that nearly two-thirds of the 7 million U.S. workers using VDT's in 1984 were monitored electronically by their employers.

The extent of the factory-like work environments in offices is currently unknown. Research on the insurance industry, for example, indicates that routine keyboarding (text and data entry, accessing of policy underwriting and rating programs) is decreasing with advanced office automation and as sales information gets entered onto the computer by agents

at the moment of sale. On the other hand, this type of environment for skilled clerical work may be increasing as the more routine tasks formerly performed by professionals are automated and taken over by the clerical function. Research on the scope and prevalence of this problem is needed.

Furthermore, there is some disagreement as to the impact of monitoring in the factory-like setting. Industry spokespersons argue that it can benefit clerical workers by giving them feedback on their performance and that it is more objective and less subject to abuse than nonmonitored performance ratings. They also argue that it encourages a rise in productivity and hence higher pay for the clerical worker. Critics argue, however, that monitoring rarely results in increased compensation and encourages a speedup in production, with clericals striving to meet already taxing work quotas.

Experts do agree that such monitoring is stressful and anxiety-producing for most workers--especially when it is done without notice to the employees--and may result in various physical and mental health problems. (See the section on health and safety.) Some express the notion that such rigid job design is also unproductive and, in the long run, inefficient. Consultants and administrators responsible for office organization increasingly recommend against centrally monitored work environments--for secretarial work, at least.

Job Design and High Tech Word Processing

Decentralized, computer-assisted word and data processing is generally regarded as a more positive job design and a good alternative to the office factory. Here secretaries and other clericals work at satellite work stations scattered throughout an organization, in face-to-face contact with their managers. In the ideal "hi-tech" form, each word processing unit is unmonitored and largely autonomous, with the tasks of the clerical being computer-assisted rather than computer-driven. This means that the operators exercise full control over the computer memory and call on the various text editing and data processing capabilities of the system as they see fit. Because of the machines' sophisticated text editing functions, the clericals are spared repetitious copy typing and retyping. The clericals also can expand their skills. Secretaries, for example, can learn new software skills including how to run accounting spread sheets and graphics programs, and file and recordkeeping management.

Unlike clericals in the large electronic pools, clericals in decentralized environments are more likely to be supervised by their immediate manager. In the automated office, as in the traditional secretarial work, trust and loyalty between the clericals and their managers, in addition to the clericals' own sense of professionalism, form the core of their motivation to produce.

Secretaries in high tech jobs perform many traditional secretarial functions as well, for example, "gatekeeping" tasks, organizing the manager's agenda, keeping track of paper files and nonroutine information,

following through on projects, and shepherding people and projects through the office bureaucracy. The combination of top computer skills and social and diplomatic skills can make word processing secretaries indispensable in offices, and put them in a position to command higher wages.

Not all decentralized word processing arrangements, however, measure up to this high tech ideal. In some organizations secretaries working on satellite machines are given only partial control over their computer's memory. This also can be supervised electronically by distant personnel departments or by their immediate manager just as readily as their counterparts in the large factory-like pools.

Clericals also may face unrealistic productivity expectations on the part of their supervisors. Unknowledgeable about the equipment's real capabilities, managers often expect clericals to work under "speedup" conditions by insisting on unreasonable turnaround time. Uninformed about text editing capabilities of the new machines, many managers give their secretaries endless and often needless drafts, edits, reedits, and corrections to make. Most problematic are those managers or supervisors who perceive the machine--not the operator--as the production unit. This is expressed in the comments of one secretary, as reported in an article in The Technological Woman:

> Bosses get ridiculous expectations of increased productivity . . . [T]hey expect major increases in output and put more pressure on you to produce; and . . . start to see you as an extension of the machine. They forget there's any operator skill involved. My bosses used to ask, 'When can you do this?' Now they ask, 'When can your machine do this?'

Wages and Status

Equitable pay and status which reflect clerical workers' actual contribution to overall office production have become important issues over the last decade. A number of recent studies analyze the skilled but "invisible labor" that women office workers, especially secretaries, perform--labor that involves making expert judgments daily, mediating conflict, reassuring and guiding customers, and negotiating cooperation among coworkers and superiors or other workers in the organization. Secretaries, as "gatekeepers" for executives, must make judgments about when to disturb the executive for a telephone call and how to put off diplomatically the unwanted call (for example, they must be able to distinguish an angry and important client from the customer who is a routine pest). In addition to knowing "who's who" in the manager's world, secretaries must have the intuitiveness to recognize urgency in a supervisor's voice, and must know how to follow complicated and sometimes poorly explained instructions.

Other clericals, such as credit clerks, bank tellers, and reservation agents, perform invisible labor as well. Typically these jobs demand

interpersonal skills. Often the workers must interact with the public and are routinely confronted with first-time problems they must attempt to solve on the spot. To do so they tend to match up the new problem with a number of past cases and then choose a way of dealing with the problem that gives the customer a satisfactory solution.

Unfortunately, the cognitive and interpersonal skills that clericals use--while handsomely rewarded at the executive level--too often go unrecognized and, in the perception of some, undervalued. While such undervaluation is perceived as a problem by other workers as well, clericals--especially secretaries--feel particularly neglected in this area. The 1981 Consensus Statement produced by Professional Secretaries International avows that "discretionary judgment, not clerical skills, is the key component of the secretary's productivity." Further, it declares that "appreciation does not replace compensation." This message is similar to the slogan of 9to5, National Association of Working Women, which calls for "raises not roses" for the secretary. In a recent survey when secretaries were asked what would make secretarial positions more appealing, the responses overwhelmingly were higher salaries (86 percent) and better status and greater recognition (77 percent).

A recent survey released by Professional Secretaries International indicates that, similar to many other occupations, secretarial pay is based mainly on seniority. The length of time with an employer has more impact on salary than skills used, education, or even job title. For example, while the lack of a high school diploma costs a secretary approximately $2,500 a year, a master's degree adds only $1,500 to the average salary. Experience counts for little as well. New secretaries earn only $1,000 a year less than those with 20 years of experience. Titles also count for very little. A move up to a higher title such as "executive assistant" or "senior secretary" is estimated to add only about $1,000 a year.

The median weekly earnings of all workers in clerical and other administrative support occupations was about $273 in 1984, an increase from the median of $258 a year earlier (see Table 2). Men clericals, however, earned substantially more than women; their weekly earnings exceeded those of women by $123. Among the various occupations listed on Table 2, the median weekly earnings in 1984 of the nonsupervisory workers ranged from $199 for hotel clerks, 71 percent of whom are women, to about $356 for transportation ticket and reservation agents--60 percent of whom are women. The median salary of secretaries, virtually all of whom are women (98 percent), was about $262; for typists (96 percent females), it was $250.

With the advent of office automation, many clericals are upgrading their skills and performing even more cognitively demanding tasks as data handlers and text editors. A prime motive in such "upskilling" is a desire by women clericals to increase their earnings. Yet, in many offices skill upgrading is not resulting in greater compensation.

Many employers believe that on-the-job training on the new equipment they provide is a sufficient substitute or trade-off for any additional pay.

Table 2

Median Weekly Earnings of Workers in Selected Clerical and Other Administrative Support Occupations, By Sex, Annual Averages 1983 and 1984

Occupation	1984			1983		
	All Workers	Women	Men	All Workers	Women	Men
Administrative support, including clerical	$272.93	$256.51	$379.74	$257.92	$249.30	$361.77
Supervisors, administrative support	401.28	323.08	486.37	370.87	320.22	458.12
Supervisors, general office	372.44	313.58	503.63	352.17	307.49	477.36
Supervisors, financial records processing	404.09	----	----	389.14	340.60	----
Supervisors, distribution, scheduling, and adjusting clerks	416.07	----	438.46	383.93	----	399.84
Computer equipment operators	301.49	263.71	368.66	285.23	261.24	349.38
Computer operators	301.37	263.48	367.94	286.57	262.57	349.28
Secretaries, stenographers, and typists	258.71	258.06	355.94	250.21	249.84	340.10
Secretaries	261.91	260.53	386.98	251.42	251.22	----
Typists	250.11	248.93	----	238.42	237.10	----
Information clerks	238.74	232.14	286.24	224.90	220.91	303.08
Interviewers	252.14	249.28	----	231.45	227.34	----
Hotel clerks	199.01	----	----	----	----	----
Transportation ticket and reservation agents	355.94	----	----	396.82	308.40	----
Receptionists	224.76	223.92	----	207.64	207.47	----
Records processing occups., except financial	257.91	251.19	302.87	256.81	251.04	339.80
Order clerks	328.93	326.89	----	306.52	299.42	----
Personnel clerks, except payroll and timekeeping	287.48	286.37	----	----	----	----
File clerks	221.33	216.38	----	210.39	206.05	----
Records clerks	260.60		----	275.55	263.25	----
Financial records processing occupations	260.54	255.85	351.82	253.95	250.12	317.87
Bookkeepers, accounting, and auditing clerks	258.69	255.84	334.47	252.49	249.35	307.19
Payroll and timekeeping clerks	286.33	266.62	----	276.17	265.89	----
Billing clerks	256.74	252.79	----	250.44	246.37	----
Cost and rate clerks	267.16	252.40	----	273.26	258.31	----
Duplicating, mail and other office mach. operators	256.80	----	----	----	----	----
Communications equipment operators	288.88	285.42	----	281.55	279.67	----
Telephone operators	289.85	288.12	----	282.41	281.71	----
Adjusters and investigators	305.20	275.58	426.71	292.30	258.43	404.34
Insurance adjusters, exam., and investigators	341.26	292.78	455.06	303.14	267.81	406.78
Investigators and adjust., except insurance	295.45	265.57	446.13	296.13	255.60	452.09
Eligibility clerks, social welfare	292.30	274.46	----	274.09	----	----
Bill and account collectors	299.63	285.01	----	277.34	258.15	----
Miscellaneous administrative support	252.40	246.57	333.68	235.11	227.20	304.80
General office clerks	262.57	257.73	307.19	244.83	237.67	296.25
Bank tellers	208.62	207.81	----	204.69	204.21	219.46
Data entry keyers	255.60	253.58	----	241.82	237.96	382.52
Statistical clerks	334.50	307.49	----	291.87	286.78	343.28

Note: Dashes indicate earnings not shown where base is less than 50,000 persons.

Source: U.S. Department of Labor, Bureau of Labor Statistics.

Some clericals agree. A growing number of workers, however, would like to see their new computer skills reflected in their paychecks. In interviews with 900 women who use VDT's in their jobs (85 percent of whom were clericals), a study found a "strong minority" of the women expressed concern about the fairness of the pay they were receiving. These attitudes were stronger among women clericals under 30 years of age.

Pressure for wages to rise in the automated office is likely to grow in the decade ahead. More information is needed, however, on how word processing jobs vary in the skills they demand, and how such variations in skills currently relate to wages. For example, while there is some understanding of the difference between high tech and low tech word processing (discussed earlier in this section on quality of work), very little is known about their respective skill requirements and the abilities they demand.

Some researchers suggest that, contrary to popular perceptions, the low tech factory-like jobs demand a great deal of cognitive skill and concentration. Yet, these may be jobs in which clericals are most likely to face a reduction in pay. Studies on variation in skills among individuals working in the <u>same</u> kind of word processing job are needed also. Secretaries, for example, generally have a sense of how much work they, as individuals, are turning out relative to other secretaries in their offices. Most want to be compensated for their individual productivity. Operators in high tech clerical jobs may have vastly different abilities to "plumb a particular software program." Speed and accuracy may make a significant difference between one secretary's performance and another's. Equitable measures of such performance, however, do not currently exist, and experts warn that crude, computer-monitored counts of keystrokes or pages typed is not the answer. Secretaries who have a knowledge of computer-assisted shortcuts or glossaries and who become the informal trainers of other secretaries need to be compensated formally for their teaching skills and knowledge.

<u>Career Mobility</u>

Women clericals have long expressed a desire for greater career mobility and the opportunity to advance in their organizations. Microelectronic technology and the sweeping changes in office organization which accompany it offer employers and managers an opportunity to improve women's access to managerial jobs. An important motivation for clerical workers to acquire computer skills has been the belief that such skills would facilitate their entry into high level computer occupations, or into higher paying managerial and executive level jobs. Contrary to the promise of many vendors and schools offering word processing instruction, preliminary research indicates that women clericals are increasingly frustrated by the lack of opportunity for advancement offered them in the "office of the future." Increasingly, in fact, there is uncertainty among clericals as to whether word processing, per se, should be viewed as a clerical, technical, or professional occupation.

One survey which included 900 female clerical workers--a large percentage of whom worked on VDT's--found that nearly a third of them felt discriminated against in terms of the "promotional and career path opportunities" available to them, compared with those available to men in their organizations. In one large customer service organization, fully two-thirds of the women responding to an employer in-house survey said they were "not satisfied with their chances for advancement."

Similar numbers were obtained in a 1983 study of professional secretaries. Here some 49 percent of the secretaries said they were dissatisfied with the opportunity for advancement offered by their jobs, with 22 percent being "very dissatisfied." In the same survey approximately two-thirds of the secretaries felt that generally there were "limitations on career path advancement for secretaries" in their company.

A review of case study research conducted for the National Academy of Sciences focuses specifically on the nexus between technology and women's occupational mobility. It links women's blocked mobility (and their lower pay) to occupational segregation into lower level computer-based jobs. This is true within the computer industry itself where men make up a large proportion of the systems designers, program analysts, and electronic engineers, while women work largely as computer operators and data entry clerks.

A concern of some researchers is the eventual elimination of many of the lower level professional and managerial jobs--jobs that women have been able to move into during the last 20 years or so. New data indicate a trend toward employers using attrition and retrenchment to reduce the number of these recently created positions through a "last in, first out" labor accounting scheme in an effort to eliminate multiple and costly layers of occupations.

Researchers also observe the potential elimination of many of the lowest level clerical positions in highly automated organizations. These have been the important (if low paid) "bridge" positions of typist, file clerk, and messenger which historically have offered women as well as minorities of both sexes an entree into the white-collar world. A 1984 Stanford University study on technology and the design of jobs in the insurance industry notes:

> Office automation has wiped out thousands of jobs for low-skilled clerical workers, created new jobs for skilled clerical workers, and eliminated many professional jobs that comprised the middle of the occupational [pyramid] and that used to constitute the rungs of a career ladder by which clerical workers could climb up into more highly skilled professional jobs . . . . As a result of the automation of underwriting and claims estimating for standardized insurance products, career ladders from skilled clerical to insurance professional positions have been eliminated . . . .

The gap between the skills of clerical workers and those of professionals has widened despite the elimination of unskilled clerical work such as coding and sorting mail and much filing, and reduction of routine keyboarding. Skill requirements for clerical workers have increased at the same time that the jobs have become overwhelmingly dead-end.

Technology may affect traditional clerical career routes as well. For years, entry typists have aspired to move up into private secretarial or, more recently, administrative assistant jobs. From there, advancement traditionally has been contingent on either the upward movement of the manager/executive or on a kind of horizontal mobility, with the clerical moving from firm to firm in search of a higher paying job in a more prestigious industry.

Office automation is changing the "boss-contingent" mobility of the secretary in dramatic ways. Increasingly, in an effort to cut labor costs, word processing operators and secretaries are being shared and assigned to work for two or more executives or managers simultaneously. As a result, more and more of the private or executive level secretarial slots are being eliminated.

In an effort to create mobility for their clericals, some employers are instituting "teams" or "pools" throughout the organization. Here small groups of secretaries work as a unit for a larger number of managers. For example, one large company recruits all new word processing clericals directly from a local community college with the explicit understanding that they will not be promoted to private secretary. Rather, they are hired as team secretaries and expected to work with three other secretaries for some nine executives. According to the company's director of personnel, while this arrangement has many advantages, it can be costly in morale as well as in wage increases. Often, after a couple of years on the job, team secretaries seek raises because they are not permitted to move up to private secretary and because they become more skilled in using the office's word processing system. Although within each unit there is a team supervisor whose job offers an alternative career route to the traditional "typist to private secretary" ladder, the number of such supervisory positions in word processing is limited.

The growing number of temporary workers filling clerical jobs is also likely to offset secretarial and clerical mobility. Temporary workers, by definition, operate outside the mobility structure of an organization. They are increasingly attractive to employers not only because they cost less than regular employees (for example, the employer is not responsible for benefits; temporaries can be hired and laid off "seasonally") but also because they spare managers from having to deal with an upwardly mobile clerical force.

To a degree, then, the automated office poses dilemmas for women seeking higher wages and promotions within their organization. One summary

on technology and compensation, reported by Datapro Newsbriefs, relates such dilemmas directly to training:

> In many cases, office workers must acquire new skills without expectation of compensation of any kind. Special training may be required merely to maintain current status. Thus, a secretary may need to learn word processing in order to remain a secretary. In this situation, motivation is negative at best, and there is little incentive to truly take advantage of what the technology has to offer . . . .
>
> On the other side of the coin, acquisition of new skills can be greeted with a raise and promotion to a newly created "specialist" position. In this scenario, the secretary learns word processing and becomes a word processing operator . . . . The risks are that employees will become too expensive in handling what have become their normal functions, or that not enough people will undertake the training--even with the incentive.

TRAINING AND RETRAINING

The shift to the automated office is dramatically changing the education and training needs of American women. Discussions to date of these changing needs focus on three points:

- the need for women to develop greater computer literacy;
- the need for cooperation between the education and business communities in providing relevant, state-of-the-art training;
- the need for equal and fair access to first-rate training and retraining programs, and the elimination of barriers inhibiting access.

Computer Literacy

Women and girls continue to be discouraged from pursuing courses which would prepare them for the most lucrative technology-based jobs. They are influenced by parents, the education establishment, and media advertisements, among others. In various ways women are made to feel that they cannot handle abstract thought, and they are often tracked by guidance counselors and teachers away from mathematics, computer sciences, and other hard science disciplines. Yet women constitute 80 percent of the students enrolled in business education courses--the training ground for the lower paid computer operator jobs.

According to Manpower Comments: "(F)emales are underrepresented in computer studies at every level from kindergarten through graduate school." A California Department of Education study found that only 37 percent of students enrolled in high school computer classes are females. A nationwide

poll of 17-year-olds shows that nearly twice as many males as females take computer programming courses. Young men also outnumber young women almost 3 to 1 in attendance at computer camps and summer classes.

The situation in postsecondary education is no better. For example, at the University of California, Berkeley, women make up only 23 percent of the computer science majors, while at the Massachusetts Institute of Technology male graduates of the computer science program outnumber female graduates 10 to 1.

Such reactive socialization in school is having a decided impact on the marketplace. It has been reported that fully 70 percent of home computer users are adult males or male children. One study estimates this proportion at 93 percent. Men, furthermore, comprise more than 80 percent of the readership of two of the largest computer magazines in the country. A California-based computer industry study in 1984 of more than 200 personal computer stores estimates that women buyers account for only 10 pecent of the stores' sales.

Experts generally agree that attributing the gap in male-female computer use to "technophobia" or "cyberphobia" is a mistake. As pointed out earlier, many studies indicate that most clericals accept technological change and appreciate their machines. It is the new conditions of work accompanying the shift in technology that they find troubling. As Dr. Eleanor Wynn put it in her keynote speech at the 1984 conference sponsored by the Women's Bureau and the National Academy of Sciences:

> People rarely demonstrate resistance to technology or change in general. They change, in fact, with amazing rapidity and adaptability. They tend to be fascinated with technology. What they do fear is a change for the worse in their immediate situation, i.e., what they are required to do on the job, a change in their competitive status relative to others, a change in performance criteria, a change in job security.

Studies do show, however, that women are not as interested in computers per se as men are. There is also some speculation among researchers that women may be more likely to see the computer--much as they may see the automobile--not as a fascinating machine in and of itself, but rather as a means to an end, a tool to accomplish a job.

Age also appears to be an important indicator of attitudes toward computers. Older female as well as older male workers are more likely to find the prospect of working with computers alienating or frightening than their younger counterparts. They also are the more likely to adapt poorly to the introduction of computers into the workplace and to experience "technostress."

One thing is clear, though. Women and men have <u>equal computer talent</u>, that is, similar aptitudes for estimating space and for completing a series

of figures, an analogy, or a sequence of numbers or letters, according to researchers at the Claremont Graduate School in California.

The Need for Relevant Training Programs

If employers are to find appropriately trained workers in the decades ahead, women clericals must receive systematic and continuous training in "state-of-the-art" word and data processing--in addition to acquiring the basic skills needed for problem-solving. A cooperative effort between industry, educational institutions, unions, and government must take place aimed at:

- o meeting women's needs for meaningful, lifelong employment
- o meeting employers' needs for employees with up-to-date skills in information processing.

Women by and large are eager to get training on automated office equipment. More than half of the secretaries surveyed in one recent study indicated they were willing to receive additional on-the-job training, and/or go back to school at the company's expense or even at their own expense in order to achieve their career goals. The majority, in fact, believed that secretaries must develop additional skills and undergo special training if they are to function effectively in a changing office.

In a paper commissioned by the National Academy of Sciences' Panel on Technology and Women's Employment, Bryna Shore Fraser of the National Institute for Work and Learning suggests that girls (and some adults, especially women) face a number of barriers in getting access to training in word and data processing.* These include: lack of confidence in their abilities, feelings of being too old, lack of career development guidance and counseling, poor educational preparation, lack of remedial education opportunities, costs and financial constraints (especially for women with lower levels of education), scheduling problems (current job and child care responsibilities), location and transportation problems, lack of relevant courses, poor or out-of-date equipment, lack of opportunity for "hands-on" instruction, and procedural problems such as red tape, credit, or inflexible admissions policies.

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* The remainder of this section on training and retraining is drawn largely from the paper by Fraser, "New Office and Business Technologies: The Structure of Education and (Re) Training Opportunities," prepared for the National Academy of Sciences' Panel on Technology and Women's Employment, Authors' Workshop, Washington, D.C., February 1985.

Where To Get Training

A major concern of women clericals is where to get training in office computer skills. In a study conducted by Research and Forecast for Kelly Services, only 13 percent of secretaries surveyed were uncertain about their ability to learn new skills, but fully 34 percent were uncertain about where to get training for the new skills. In earlier days the vendors who sold the equipment provided all training. Typically one or two secretaries would be selected by their company to go to a vendor and learn how to use a particular piece of equipment. The secretaries returned to their firms and then attempted to adapt what they had learned to the work at hand. In turn, as more equipment came into the office, the same secretaries would become informal "teachers," passing along their knowledge in a more or less random fashion to new users.

Today the training function is being formalized in-house by employers. In a study conducted for the National Commission for Employment Policy, the researchers found that among workers using computers in their jobs, training for the large majority of them is paid for by employers and provided by the companies' staff, vendors of computing equipment, professional associations, unions, and schools. The study, focusing on workers in many occupations in addition to clerical workers, concluded that although computer use is widespread and growing, relatively few workers need extensive education or training in computer-related skills, and that most workers learn their skills in on-the-job training.

The most prevalent sources for training in clerical automated jobs are employers, proprietary and public vocational institutions, community service organizations, professional associations and private enterprise consultants, government/private sector partnerships, and unions.

Employer-Based Programs

Business has long been an educator in the United States. One rough estimate suggests that industry today spends close to $30 billion annually on employee training. The outlay for training, however, is far less than the outlay of capital for equipment (approximately one-tenth as much). In 1982, companies invested $3,600 on the average per worker per year in new facilities and equipment, but only $300 per worker in training.

The cost of clerical training--especially the acquisition of typing and shorthand skills--has until very recently been borne largely by educational systems and by individual clericals. Some employers, in fact, continue to look outside their organizations for word and data processing specialists rather than retrain their own secretaries and typists. A survey of 300 executives at Fortune 1500 firms indicates that a very high percentage of them were more likely to hire new workers with the required skills from outside their organizations than retrain their present workers whose skills were out of date. Another study, a 1984 industry survey, reveals a similar outcome: more than two-thirds of those responding indicated that they make no special effort to retrain employees. Among those that did provide

training to their employees, however, the second largest proportion of firms (24 percent) provided retraining to office/secretarial employees; about 31 percent of those surveyed offered retraining to their production workers.

Due to the increased need for appropriately trained workers, employers --especially large companies--are getting more involved in training. According to the National Institute for Work and Learning, employer-sponsored training is of four main types:

- o in-house programs where employers either develop or buy training programs for their clerical staff;
- o training contracts between employers and postsecondary educational institutions;
- o employer-financed tuition assistance plans;
- o union-negotiated training programs.

Such employer-sponsored programs are extremely useful in helping women clericals overcome financial, scheduling, and educational barriers. Most training programs are offered at or near the workplace during regular working time, are short-term and have practical "hands-on" curricula, use state-of-the-art equipment, and are paid for by employers. Some are paragons of innovation.

At one West Coast company, for example, word processing users can learn or update their software skills at an on-the-premises "continuous learning center." In order to develop individual capabilities and encourage user innovation and customizing of systems, clericals are encouraged to practice on their own clerical work rather than on boilerplate training packages. The centers also provide continual expert assistance to secretaries with whatever hardware or software problems come up. Clericals have "hot lines" they can call for help, as well as access to trained specialists or troubleshooters who make work station "house calls."

For the most part, however, clerical on-the-job training in word and data processing is in its infancy, with the few experimental programs in existence taking place in very large corporations or government agencies.

Educational Institutions

Educational institutions--both proprietary and public--are also retooling their operations in an effort to offer word and data processing training to clerical workers. Too few vocational education programs, however, are geared to a changing high tech economy, particularly to changes occurring in clerical and service jobs where a disproportionate number of women are employed. According to the executive director of the American Vocational Association: "The nature of the market place is changing pretty dramatically and that means vocational education will have to change. Most

programs for preparing secretaries do not have word processing equipment and are still relying on typewriters." (The New York Times, April 3, 1984.)

In large part the lag in vocational educational training and labor force requirements is due to the extraordinary expense involved in purchasing up-to-date equipment as well as to the confusion created in trying to determine which of the numerous hardware and software systems on the market offer the best training for particular students. To that end, vocational education institutions, including public high schools and proprietary and nonprofit technical or business schools, are under pressure to begin to reshape curricula, update equipment, and retrain teachers and career counselors in ways that realistically reflect an increasingly computer-based job market.

Educational institutions offering training in word and data processing fall into two broad types: proprietary trade or technical schools (noncollegiate postsecondary schools) and occupational programs in high schools and in community and junior colleges.

o Proprietary trade or technical schools. These schools, often privately owned, train students for a single vocation, such as word processing operator, bank teller, telephone operator, or secretary. Programs in computer-based clerical jobs range from 2 weeks to 2 years. The student pays for the training. Enrollments--up 25 percent since 1983--run about 1.5 million people annually, with women constituting 52 percent of enrollees.

Evidence is mixed on the effectiveness of these schools in training students for employment. Prospective students are advised to investigate thoroughly the costs, financial aid, job placement rates and assistance, refund policies, quality of programs, and completion rates.

o Public school systems. These are exemplified by occupational programs in high schools and in community and junior colleges. Enrollments here include large numbers of blue-collar and service workers, older workers, and disadvantaged workers. Women make up 55 percent of enrollments. The curriculum often is developed in partnership with industry and business groups. Efforts are made to schedule classes and training center locations so as to accommodate adult women's needs. Word and data processing training tends to be more customized to user's educational level and employment preferences than in the technical or trade schools.

Other Training Resources

o Community organizations. A growing number of local service organizations such as the YWCA offer courses or seminars in word and data processing or computer literacy. Equipment is usually donated by computer vendors. These programs generally are inexpensive and have a broad appeal to all age groups.

o Professional associations and private enterprise consultants. Groups such as the American Management Association or grassroot consulting entrepreneurs run 1- to 2-day "introductory workshops" on computer literacy and microcomputer use, as well as time management and productivity issues clericals are likely to experience in the new office. Hands-on use of computers is limited. Costs are usually high, but often are paid by employers.

o Government/private sector partnerships. In programs under the Job Training Partnership Act (JTPA), which authorizes Federal grants to States for employment and training programs that serve primarily disadvantaged persons, there is a move toward training and retraining clericals on word and data processing equipment. In conjunction with the International Business Machines Corporation, for example, community-based organizations in some 32 cities across the United States have opened "word processing training centers." Here the individuals, most of whom are women, are given training on up-to-date equipment donated by IBM in word processing, computer programming, and computer operations.

The Carl D. Perkins Vocational Education Act also offers help in this area. Effective in July 1985, it reauthorizes vocational education programs at the State and local levels for the next 5 years. The act provides Federal funds to States to expand and improve existing vocational education programs and to develop quality programs to meet the needs of the country's current and future work force. The law establishes, for the first time, an industry-education partnership for training in high technology occupations, and emphasizes assistance to women.

As with JTPA, the role of the private sector in vocational education has been greatly enhanced under the Perkins act. The latter also contains a number of provisions calling for coordination with JTPA programs at the State and local levels.

o Union-sponsored training programs. Unions sponsor or negotiate for a variety of training programs for office workers. The following examples, according to information from CLUW (Coalition of Labor Union Women), indicate the types of training arrangements offered.

--CSEA (Civil Service Employees Association), Albany, N.Y., Local 100 of AFSCME (American Federation of State, County, and Municipal Employees), sponsors the "Clerical and Secretaries Advancement Program," which provides opportunities for workers to learn new job skills where technology has moved into their offices. This training may range from a 6-hour course to 8-12-week seminars. In addition, CSEA, in conjunction with New York State, offers longer term training programs in the Albany area, with some tuition assistance from the employer.

--SEIU (Service Employees International Union), Santa Clara County, Calif., Local 715, has negotiated with the county to provide workers a leave of absence for training because of new technology and automation introduced into their workplace. The employer determines the type of training needed,

such as at a community college or through an in-house program. The costs are paid by Santa Clara County.

--The Newspaper Guild has contracted with scores of newspapers around the country to provide training to any employees without skills to use new technology equipment introduced. For example, at the New York Daily News the training, at the publisher's expense, is to be no less than 3 months and no longer than 6 months.

--OPEIU (Office of Professional Employees International Union) has an agreement with the New York Stock Exchange to provide a self-development training program whereby an employee can find her or his own training and is reimbursed for costs not to exceed $400.

EQUAL OPPORTUNITY AND TECHNOLOGY

The costs and benefits of new technologies are rarely shared equally by all members of society. Numerous experts agree that the effects of office automation on women's employment opportunities will probably vary by race or ethnic origin and age, as well as other factors. Some of the questions being raised relevant to equal opportunity include: How is office automation affecting minority women and older or less educated women clericals? What impact, if any, is it having on equal opportunity in the American office?

Minority women have made important strides in the work force over the last decade. While their employment in managerial and professional specialties has improved somewhat, their employment in clerical and other administrative support jobs has increased even more during the 1970's and 1980's. Today, nearly 30 percent of all employed minority women are clerical workers.

These statistics represent a significant rise in occupational status for minority women. Where a decade ago many were locked into low paying domestic service or minimum wage factory jobs, the last decade has offered them the chance to work as typists, secretaries, and office clerks.

While such improvement is gratifying, there is reason for concern for the future position of minority women in the high tech work force. First, like women generally, they are underrepresented in the middle and top level professional and technical computing jobs. For example, Bureau of Labor Statistics data suggest that black and Hispanic women occupy only about 3 percent of the professional and technical level computer jobs but five times as many (16 percent) of the lower level data entry and computer operator jobs.

This underrepresentation holds across industries, including the high growth, high tech office and computing machines industry itself. Here minority women compose only 2.4 percent of the professional workers and less than 1.5 percent of high tech sales workers. At the same time they hold 11

percent of the office and clerical jobs, and nearly 20 percent of the lower level operative and laborer jobs.

Research, moreover, suggests that minority women's recent advance into clerical jobs is being adversely affected by computer-based equipment. Behind this apprehension is the considerable reorganization of work that accompanies the introduction of word and data processing--reorganization which can entail deskilling and elimination of lower level clerical jobs. Minority women make up almost one-fourth of all women file clerks and more than one-fifth of all women employed as office machine operators, typists, telephone operators, and stenographers--occupations already undergoing change.

The challenge posed to minority women by the new technology is illustrated by analyses of the relation between technological change and women's employment in specific industries. In 1984 only 5.9 percent of all secretaries and 8.6 percent of all stenographers were black. In certain industries, minorities hold an even smaller percentage of the top clerical jobs. For example, according to an analysis of the insurance industry published by Stanford University Institute for Research on Educational Finance and Governance: "Minority women have only recently penetrated clerical work and are still found mainly in the less skilled clerical jobs. Automation is eliminating precisely those jobs (routine keyboarding, filing) in which black women are present in significant numbers."

In the telecommunications industry, more than 70 percent of the minority women are in office and clerical positions, including a large number in switchboard operator jobs that are systematically being phased out by sophisticated computerized switching systems.

The studies suggest that there is a tendency toward tracking black and other minority women into the centralized, back office "transaction environments" in industries like banking, insurance, and finance, where they may work at high stress factory-like jobs characterized by low pay, poor benefits, electronic monitoring, and productivity quotas. A 1984 survey by 9to5, National Association of Working Women, reports that black women respondents were twice as likely to face quantitative production quotas as white women. Even within job categories where production quotas are common, it found, for example, that 56.5 percent of the black electronic data processing clerks worked under production quotas, compared with 30 percent of their white counterparts.

Minorities may be affected by the electronic office in other ways as well. New research indicates that electronic telecommunications technology makes it possible for employers to move clerical work away from geographical locations such as inner cities, where most minorities live, to other areas. The new locations include middle-class, predominantly white suburbs, rural areas, and "offshore" Third World countries.

Suburban and Rural Centers

A seemingly developing trend of moving clerical jobs away from central cities to suburbs and small towns was described in a paper presented at a Rutgers University conference in 1983 on the structural dislocation of women. The authors noted the transfer of a company's home office from a central city with a 40 percent minority population to a suburban area that is 90 percent white. They also described several new operations set up by the same company in "small towns where minorities represented 3.1 percent, 3.3 percent, and 14.3 percent of the population."

This thesis is developed in a recent doctoral dissertation on labor supply and spatial relocation in the San Francisco Bay area. The researcher tracked the transfer of jobs from metropolitan San Francisco with its low income, predominantly minority female work force to the higher income, predominantly white suburban female work force of the inland Bay area. The researcher concluded that this transfer of jobs is not a mere side effect of back office relocation, necessitated by employers' land cost considerations, but rather an attempt by employers to tap a higher educated work force whose members are not the sole support of their families, and therefore are willing to work in jobs with low pay and no mobility.

Offshore Clerical Work

Another move particularly affecting minorities, older women, and less educated women seeking clerical work is the transfer of clerical jobs out of the U.S. boundaries to cheaper, usually Third World, labor forces. This transfer is made possible by satellite technology and advanced computerized telecommunications systems, which hook up foreign video display terminals through satellite or telephone cables to mainframe computers in the United States. Such a link makes it possible for workers thousands of miles away from the United States to perform data and text entry operations as though they were in the same building.

The attraction of investing in such offshore work for American industry is reduced labor costs. Where data entry operators in the United States receive $6 to $20 an hour, Bahamian, Chinese, or Korean women operators may work for $2 to $3 an hour. For example, a large legal publishing firm sends materials to South Korea where non-English-speaking workers keypunch complex legal documents into the firm's data bank. Similarly, an airline now has the bulk of its keypunch operations done in Barbados.

Since labor standards in the Third World sites tend to be far less rigorous than labor standards in the United States, employers who look to offshore resources avoid legal liability for unhealthy or dangerous working conditions.

HOME-BASED CLERICAL WORK

Computers and communications technology are changing the "space and time" relations of women and their work. The telephone has long made it possible for women to engage in sales and service activities from their homes. Microprocessors and personal computers now make it possible for women to earn money doing clerical work in their homes.

This feat--sometimes called "electronic homework" or "telework"--is accomplished typically by tying a home computer with word and data processing capabilities into a company's central mainframe computer. While the total number of telecommuters doing office work today is relatively small--around 15,000 people--the potential for growth is enormous. Estimates of the number of teleworkers doing office work by 1990 range from 5 million to as many as 18 million.

Women are expected to make up a substantial proportion of the telecommuters of the future. This is due to the fact that in American society, while more and more women are seeking work in the paid labor force, they continue to have primary responsibility for home and family care. These responsibilities make home-based work extremely attractive to women insofar as it allows them:

- o flexibility, especially the opportunity to control their own work hours and to schedule job tasks around household demands.

- o the opportunity to be with their very young children and to save on costly day care. (A 1985 National Academy of Sciences paper reports "the average cost of day care for two children is $4,000 a year--nearly one-third of the average working woman's income.")

- o a way to avoid the stress of commuting. (Americans on the average travel about 22 miles a day getting to and from work.)

- o savings in such costs as food, clothing, and transportation associated with working. (One survey reports savings of up to $200 a month on food; $100 on clothes; and $100 on gas, parking fees, and insurance.)

Electronic homework also appeals to women without options to go out to work in the marketplace, such as handicapped women or women who must look after an incapacitated spouse or other family member. It also is an attractive employment option for rural women, long isolated by distance from job centers or training institutes.

Electronic employment has a number of attractive features from the employers' perspective as well. It gives employers access to a skilled work force of women who, because of geography or family responsibilities, were formerly unavailable as traditional commuting office workers. It may result in increased productivity. Productivity increases ranging from 15 to 80

percent by homeworkers have been documented. Homework generally offers employers a cheaper labor supply. Home-based clerical workers are often part-time workers whose spouses' labor force status enables them to work in jobs with little or no benefits. Finally, homework typically reduces capital overhead costs for employers, enabling them to shift those costs to the employee.

Experts studying home-based clerical work frequently point out that the advantages it offers to employers harbor potential disadvantages for the women homeworkers. For example, although home-based women clericals in general may be receiving somewhat higher pay than clerical workers in offices, they must nonetheless take on some new costs such as higher utility bills (for example, costs of leasing computer telephone lines) and purchase and maintenance of capital equipment. In some cases home-based clericals must rent or lease their computer equipment directly from their employers for a fee.

Day care also continues to be a problem. The demands of work at home often are such that homeworking mothers must make day care arrangements of some sort. In one study, for example, 50 percent of the mothers found it necessary to have a paid babysitter for part of the time.

Savings in commuting, clothing, meal costs, and tax deductions for home-based offices are in some cases offset by other indirect costs. Many homeworkers receive irregular incomes due to the uneven or "seasonal" workload on their part-time status. Typically, they do not receive health or vacation benefits, nor are they eligible for pension coverage or fair labor standards protection.

According to a report forthcoming from the Office of Technology Assessment, a congressional research agency:

> Cost savings of working at home must be balanced against additional direct and indirect costs. Some workers must lease terminals or pay for special telephone lines. Many provide the furniture that they use. Workers pay higher electricity bills because of the equipment in their homes. Some report additional heating and cooling bills for the home . . . .
>
> Clerical homeworkers almost certainly have a reduced income relative to their peers in the office. Even if the pay rate is technically the same, many are shifted to part-time or piece rates, without workers' benefits. Part-time and piece rate workers usually report that their workload is very uneven . . . . The lack of a regular, level income can be as much of a problem for workers as is low pay.

Homework may involve emotional costs as well. Sociologists have long argued the danger of "role overload" and the positive aspects of separation of the workplace and the home in time and space, which reduces many incompatible demands made upon women by employers on the one hand and by spouses on the other. Home-based office workers often trade the flexibility

and control they gain over their working hours for the stress of managing home and work responsibilities simultaneously at one site. Such interruptions may be especially troublesome for clericals working against "piecework" demands or quotas under electronic supervision. (From a technical standpoint, clerical work "on line" can be monitored at home just as easily as it can be monitored in a large typing pool, with supervisors making random checks to see how a piece of work is coming, what page the clerical is typing on, etc.)

Social isolation is another problem. Interpersonal relations with coworkers have long been a source of job satisfaction among clerical and other workers. Long hours at home without the companionship of colleagues and peers are reportedly a problem for some homeworkers. One study reports that young, never married workers are the most likely to give up home-based work after trying it because they miss the social aspects of the office. Homeworkers also may face the hazards of "workaholism" on the one hand, and the need for extreme self-discipline on the other.

Other potential problems homeworkers face include the absence of health and safety protection, workers' compensation coverage, and equal opportunity to move up in an organization. The latter is particularly a concern for women. Upwardly mobile clericals (and professionals) who choose to work at home most of the time run the risk of being permanently cut off from careers in the upper levels of their organizations because of their exclusion from the informal but important power structure of the office where aspects of achieving success include familiarity and face-to-face contact.

The flexibility that homework offers some women clericals, however, may very well present opportunities that offset the problems.

HEALTH AND SAFETY

Health problems associated with the automated office--particularly those of clerical workers operating VDT's--are a subject of growing concern. Manufacturers of video display terminals suggest that there is little inherent danger in the technology itself. Nonetheless, terminal users consistently report vision problems; muscular problems such as back, neck, and wrist pain; and mental stress. Their complaints are believed to be associated with problems in the office environment, their personal work station, the design of their job, and organizational factors.

Ergonomic factors reported by clerical workers as problematic include workplace illumination and screen glare; VDT screen viewing distance and angle; furniture design; and temperature, humidity, ventilation, and noise levels. Job design factors associated with certain kinds of VDT work, such as highly paced work, lack of control, and deadline pressure, also have been thought to contribute to health problems. Organizational factors including lack of worker participation in implementing office automation, inadequate training, threatened job security, electronic monitoring, and incentive pay schemes have been cited as sources of distress.

Four major areas of concern related to VDT exposure to workers are:

- o effects on vision
- o musculoskeletal effects
- o stress
- o reproductive effects.

Visual Difficulties

A publication of the Harvard Medical School points out that people operating VDT's report discomfort or difficulty with their eyes more often than other workers who hold visually demanding jobs. Among secretaries responding to a national survey sponsored by a leading temporary employment agency, 73 percent said they had experienced an increase in eyestrain with the use of video display terminals. Specific problems mentioned across different studies include eyestrain or visual fatigue, blurred vision, headaches, and difficulty with focusing or accommodating one's eyes.

While research on the subject is by no means definitive, experts trace these problems to glare and the "flickering" of display characters, poor character resolution, and work areas that have been illuminated and designed to accommodate traditional clerical work--work involving typewriters and paper copy held horizontally--not the new kind of glare-sensitive VDT work which involves working with both vertical (screen) and horizontal (paper) copy simultaneously.

A research report by the Technical University of West Berlin, Germany, cited by the Bureau of National Affairs, states:

> When the focus of the eyes is changed from far to near for VDT work, several eye muscles are required to make the adjustment . . . . Additional eye strain is created as a result of constant rapid switching of eyes from paper copy to the keyboard and screen and back--up to 33,000 head or eye movements per day.

A 1983 study conducted by vision experts for the National Research Council, however, found that visual difficulties very probably are not due to anything inherent in VDT technology.

Due to the large number of complaints reported by users in a variety of surveys, however, research on this subject continues. Meanwhile, vendors,

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Note: For a detailed discussion of existing research and the debate surrounding VDT's, see the Bureau of National Affairs Special Report, "VDT's in the Workplace: A Study of the Effects on Employment," 1984.

medical experts, and clerical advocacy groups recommend vision breaks and eye exercises. They also recommend that individual needs dictate lighting, keyboard and screen height, screen-face angle, and viewing distance. Many groups, including the National Safety Council, also point out the need for periodic vision examinations to make sure any vision problems are discovered and quickly corrected. Eyeglasses should be refracted to the eye-to-screen distance--a practice, until recently, rarely checked by eye specialists unless specifically requested to do so.

Musculoskeletal Problems

VDT work can be extremely constricting to the musculoskeletal system of the body. Clerical work has always been largely sedentary. VDT technology, however, increases its sedentary nature. Intensive concentration on the screen--especially when work is electronically monitored--can severely restrict an operator's movements, and result in discomfort or pain involving the back, neck, and shoulders, and less frequently the arms, wrists, hands, and legs. To the extent that technology eliminates the need for files or paper, even unmonitored VDT work has been found to be restrictive.

Improper work station and furniture design is the major factor in VDT musculoskeletal problems. These problems are compounded in many office settings by computer-based clerical jobs which are highly repetitive. It has been reported that the rapid keying associated with routine data entry tasks may lead to tenosynovitis and eventually to carpal tunnel syndrome, a disorder resulting from compression or irritation of the tendons in the wrists, although generally associated with wrist twisting rather than typing. This disorder can cause numbness, a stinging sensation, and pain. The Bureau of National Affairs reports research showing that women are three times more susceptible to these kinds of repetitive-motion injuries than are men, with middle-aged women the most susceptible of all workers.

As with vision problems, research on musculoskeletal problems continues. Experts meanwhile underscore the importance of detachable keyboards, posture-enhancing chairs with backrests, and, as already mentioned, work station arrangements that provide a comfortable viewing angle of the screen. Many authorities also recommend frequent rest breaks. For example, the National Institute for Occupational Safety and Health recommends rest breaks or other work activities for every 2 hours of intensive VDT work. Many experts also recommend body exercises and/or the opportunity to move around the office place.

Stress

"Technostress" is a byword of the electronic era. Stress and stress-related illnesses associated with work on video display terminals is the subject of intensive research. Analysts examining various kinds of occupations report that secretaries and clericals--rather than executives--are the prime targets of technostress and stress-related illnesses including coronary disease.

In a 1984 National Survey on Women and Stress conducted by 9to5, National Association of Working Women, over 32 percent of all respondents described their jobs as very stressful. While managerial women were the most likely to describe their jobs as stressful, women in lower level jobs--including clerical jobs--reported the highest rates of both stress symptoms (for example, nausea, insomnia, fatigue, digestive problems, headaches) and stress-related illnesses (for example, ulcers, colitis, high blood pressure, gastritis, heart disease). Another study, reported in a paper presented at the 1984 meeting of the American Anthropological Association, found that of 974 female full-time clerical and secretarial workers surveyed, nearly 40 percent said their jobs were often or always stressful.

These stress problems are particularly associated with monitored clerical work, according to a report by the Harvard Medical School. Work involving productivity quotas; electronic supervision and pacing; boring and repetitive tasks; insufficient training; and inadequate rest breaks were found to be particularly stressful. Typically these are "high demand, low control" and low status jobs, that is, jobs which are very demanding but which do not allow clerical workers control over how they do them.

The National Survey on Women and Stress confirms the stressfulness of intensive monitoring on the job, as well as the stressful nature of clerical jobs which involve great responsibility but little authority. Just as significantly, it points out the stressful nature of clerical jobs where one works for an unsupportive manager or where the clerical worker is treated with disrespect.

In addition, of course, many clerical women face the stress of playing two important roles at once--as workers and homemakers. According to researchers at the School of Public Health at Columbia University, the average working woman is estimated to spend 30 to 40 hours a week on housework <u>in addition to</u> the 40 hours she spends on a paid job. They cite a Swedish study of women office workers in which clericals who were forced by an emergency to work a 73-hour week for 4 weeks showed unusually high amounts of adrenaline in their blood after the work was completed. Moreover, there was an observable time lag between the height of the work emergency and the greatest buildup of stress hormones in the clerical workers' bodies, suggesting that the stress of their work "followed them home" and made them tired and irritable.

<u>Reproductive Hazards</u>

The potential hazard of radiation emission from video display terminals is a subject of growing public discourse. Representatives of unions and women's health and advocacy organizations argue that radiation leakage from VDT's may be associated with congenital birth defects, spontaneous abortion, and miscarriage in females, as well as with male infertility. They point to excessive levels of ionizing radiation associated with VDT work on improperly functioning (usually older) VDT's, and the existence of some 11 unexplained "clusters of pregnancy problems" of VDT users reported in the United States and Canada over the last 5 years.

Computer manufacturers and most medical experts, on the other hand, deny allegations which associate VDT use with reproductive harm. They cite a variety of government and industry studies indicating that emissions of all types of electromagnetic radiation from VDT's are well below accepted occupational and environmental health and safety limits. They point out that in our daily lives we are constantly exposed to very low levels of radiation which do us no harm--low levels of radiation from the sun, rocks, televisions, toasters, and fluorescent lighting. They also argue that the clustering of reported miscarriages and birth defects by VDT users is a function of "statistical chance" not VDT exposure.

Other researchers, however, suggest that very low frequency radiation may cause biological changes, if not biological damage. They cite the lack of information available on risks associated with long-term exposure to low levels of nonionizing radiation emitted by VDT's, and call for better data in the form of systematic epidemiological research on the subject of problem pregnancies.

The National Institute for Occupational Safety and Health--noting that from 1 to 5 percent of all pregnancies are exposed to VDT's--is undertaking a large national study of adverse reproduction outcomes among women users. The study will involve a survey of 6,000 married working women of childbearing age, half of whom will be VDT users. Results should be available in 1987.

In the meantime, various unions and women's advocacy groups are recommending that pregnant women be allowed to shift from operating VDT's to other kinds of work for the duration of their pregnancy, without the loss of seniority, pay, or benefits. Some unions have developed sample VDT contract language, guidelines, or bargaining recommendations involving pregnant workers. For example, the British Columbia Government Employees Union of Canada negotiated a provision that employees who regularly work with VDT's must have the right, if pregnant, to transfer to another job without loss of pay, or to take an unpaid leave of absence. In November 1984 District 925 of the Service Employees International Union negotiated a contract with a major insurance company whereby pregnant VDT workers in one of its offices have the right to transfer to non-VDT work without loss of pay. (For a discussion of this issue, see the Wall Street Journal, April 6, 1984.)

Legislation and VDT's

Although the U.S. Congress has held hearings on the health and safety aspects of VDT use, no Federal legislation regulating VDT use has been passed. At least 14 States have introduced legislation and at least 3 States have passed laws to examine problems associated with VDT use or to regulate VDT working conditions.

The Computer and Business Equipment Manufacturers Association has taken the position that VDT use raises comfort rather than health and safety issues and that there is no reason to consider legislation or regulation on VDT's at this time. The industry is responding to concerns and questions

about the use of VDT's through training programs, brochures, articles, and public service announcements.

The Newspaper Guild and 9to5, National Association of Working Women, have developed model State VDT legislation, and in 1984 the Service Employees International Union and 9to5 launched a joint campaign in 18 States for the enactment of State legislation or regulations to protect VDT operators from health hazards believed to be associated with VDT use.

SUMMARY AND CONCLUSIONS

The sweeping changes taking place in today's offices as a result of computer-based technologies underpin the array of issues reported here. The scope of these changes should not be minimized. Individual women workers, managers and organizations, and the Nation as a whole are being challenged by the changing work environment.

Greater efficiency and productivity are two promising outcomes of office automation, but they are not independent of the people who utilize and operate the new equipment. Current research suggests that clerical workers often are excluded from the planning and implementation decisions accompanying the current phase of technological change. Too often their jobs are redesigned without their input. Too often they must carry out their tasks in working conditions that are aggravating or even unhealthy. Too often when new career tracks are laid in computerized offices, the older women and minority women are bypassed.

Much research is needed on the question of precisely how the new office is affecting women clericals. These conclusions summarize findings as well as issues that are identifiable at the present time (observations), and point out questions which call for the attention and monitoring of researchers in the future.

The Quality of Work

Like other workers, clerical workers want to derive intrinsic as well as extrinsic rewards from their work--they want jobs that are interesting and challenging and that offer them pride, respect, a decent salary, and opportunities for promotion. While some of the concerns are transferred from the traditional office, the advent of automation has raised additional concerns for secretaries and other clerical workers, perhaps multiplying the dimensions of some older problems.

Observations:

o Most clericals accept technological change and have positive attitudes about the new equipment they use. But what some find troubling are the new conditions of work accompanying the change.

o There is a lack of privacy and space in the new "open systems" offices; improper chair and desk design, noise, and poor air quality are among other problems in some offices.

o The lack of access to consultants trained to troubleshoot software and hardware problems creates further problems for electronic equipment users.

o Factory-like environments have been created in too many electronic "back offices." Supervision is impersonal in these systems processing centers, where typically one manager oversees a large number of operators. Rules are rigid, and tasks are often boring and repetitive.

o Monitoring by computer to record individual performance and productivity is sometimes carried out without notice to the employees.

o Secretaries are not necessarily compensated for their computer skills. Nor are they rewarded for being informal teachers or trainers who not only learn the system but pass along their knowledge to other workers, including their superiors.

Questions:

o In what ways is the content of work changing in different clerical occupations? What proportions of new jobs are being downgraded and deskilled or redefined and upgraded?

o Are the wages of clericals who operate word and data processing equipment increasing or decreasing?

o How do word processing jobs differ according to the skills they demand? And are the differences correlated to salary ranges?

o How does technology affect the career routes of women who enter clerical work? Are the expectations of those who want to move up to higher level jobs in their organizations being met?

Training and Retraining

Perhaps the most crucial issue related to technology and workers is the need for appropriate training and retraining. Cooperative planning and decisionmaking are necessary to achieve effective programs for the education, training, and retraining of workers and potential workers. It is imperative that business and industry join with educational systems, government, and nonprofit organizations to determine educational needs, to formulate policies based on those needs, and to develop human resources capable of responding to the most difficult challenges of technological change.

Observations:

o Women and men have equal computer talent--their aptitudes for estimating space and for completing series, sequences, and analogies are similar. Yet, women and girls continue to be discouraged from taking mathematics, computer sciences, and other science disciplines--courses which would prepare them for the most lucrative technology-based jobs.

o Older workers are more likely to find the prospect of working with computers frightening than their younger counterparts.

o Many vocational education programs preparing secretaries for the world of work continue to use the traditional typewriters rather than word processing equipment.

Questions:

o To what extent is new technology equipment being underutilized due to a lack of adequate training of the users?

o What efforts are being made to inform women about where to get training?

o What are the most practical and expeditious ways for educational institutions, including public high schools and proprietary trade and technical schools, to reshape curricula, update equipment, and retrain teachers and counselors?

o Who will bear the cost of training and retraining workers?

Equal Opportunity and Technology

The potential for discrimination on the basis of gender and race has been noted by researchers. More research is needed, however, to determine the scope and frequency of discriminatory practices or potential problems.

Observations:

o There appears to be a tendency to track minority women into word processing pools which typically have factory-like environments and where the jobs are characterized by low pay and poor benefits.

o Minority women are more likely to face quantitative production quotas and electronic monitoring than their white counterparts.

o The transfer of clerical jobs outside of U.S. boundaries to cheaper labor forces--usually in Third World countries--may be affecting opportunities for women seeking clerical work, particularly for minorities, older women, and less educated women. Satellite technology and advanced telecommunications systems make it possible for workers thousands of miles

away to perform data and text entry operations as if they were in the same building.

Questions:

o While increasing numbers of minority women seek to move out of low paying service jobs into clerical work, will the number of clerical jobs shrink as more and more functions are automated?

o Will jobs in the professional and lower managerial categories, where women have recently made inroads, be resegregated as "women's work" and reclassified downward?

o Is there a developing trend toward companies relocating in the suburbs and rural areas, away from central cities where most minorities reside? If so, how can the trend be reversed?

Home-Based Clerical Work

Increasing numbers of women are performing clerical work in their homes through the use of personal computers or microprocessors. Estimates are that approximately 15,000 people, mostly women, are doing "electronic homework" or "telework"; by 1990--just 5 years from now--the number, according to rough estimates, may range from 5 million to 18 million. Although home-based work is attractive to some women, there also are attendant problems.

Observations:

o Women are attracted to electronic homework insofar as it allows them to control their own work hours and schedule job tasks around household demands.

o Rural women who are isolated by distance, handicapped women, and women who have to take care of an incapacitated person at home find electronic homework appealing.

o Employers using homeworkers have reduced overhead costs and have found increased productivity among the teleworkers.

o Most teleworkers do not receive health or vacation benefits, pension coverage, fair labor standards protection, workers' compensation coverage, and health and safety protection.

o Home-based work, despite its attraction, is not a substitute for day care problems, as many women often have to hire someone to help with child care part of the time, or are subject to simultaneous and stressful demands from family and an employer.

Questions:

o What costs are incurred by teleworkers for leasing computer lines, purchase and maintenance of equipment, or rental of equipment?

o Is the work--and therefore the income--constant or spasmodic?

o Is there a danger of "role overload" due to stress from managing home and work responsibilities at the same time and same site?

o Is social isolation a problem?

o Does the risk of being physically and visually excluded from other workers, especially managers, affect prospects for achieving career upward mobility?

Health and Safety

Concern continues to mount over the possible health problems associated with the automated office, particularly the linking of health impairments to video display terminals (VDT's). Manufacturers, vendors, medical experts, independent researchers, women's advocacy groups, and users all have expressed divergent views on the matter of health and safety. Meanwhile, research continues for definitive answers about possible visual difficulties, musculoskeletal problems, stress, and reproductive hazards associated with VDT's.

Observations:

o No Federal legislation regulating VDT use has been passed; Congress has, however, held hearings on the health and safety aspects. A number of States have introduced legislation and at least three have passed laws to examine problems or to regulate VDT working conditions.

o Users of VDT's have reported problems with vision; back, neck, and wrist pain; and mental stress.

o User problems may be connected to the work environment: ergonomic factors such as lighting and screen glare, screen viewing distance and angle, furniture design, air quality, and noise levels; job design factors including deadline pressures and lack of control over work; and organizational factors such as inadequate training, electronic monitoring, and exclusion of users from participating in the implementation of automation.

o Visual difficulties probably are not due to anything inherent in VDT technology. Nevertheless, experts recommend vision breaks, eye exercises, and periodic visual examinations.

o Secretaries and other clericals--rather than executives--are the prime targets of stress-related illnesses called "technostress."

o It is estimated that the average working woman spends 30 to 40 hours a week on housework in addition to 40 hours on the paid job.

Questions:

o What can be done to decrease the sedentary nature of clerical work which has become even more restrictive with VDT technology?

o How can the redesign of jobs eliminate suspected and potential health problems of VDT users? Or must the remedy result from redesign of technological equipment?

o To what extent does electronic monitoring contribute to mental stress of workers?

o What are the potential hazards of radiation emission from video display terminals?

Future Jobs

To the many questions posed about the visible, present-day electronic office, another key question must be added: What is known about the electronic office of tomorrow and how will emerging technology affect prospects for employment of clerical workers?

Although this report does not focus on the issue of how automation is affecting the quantity of jobs available in the clerical area, a basic question in assessing the future of any occupational field is how many and what kinds of jobs will there be. That question is difficult to answer in relation to office occupations, but an article in the Occupational Outlook Quarterly, spring 1985, notes:

> Advances in microtechnology cast doubt on the likelihood of continued growth in clerical fields. Declines are likely in some office occupations . . . but large-scale displacement is not expected during the next decade. In the more distant future, however, there is more uncertainty about the effect of office automation on employment.

By increasing productivity and changing many office procedures, computer-based technology has a vast potential impact on employment prospects for clerical occupations. Few experts question that point. But what is not known is how fast office information processing technologies are spreading, how the equipment is being used, and which occupations are being most severely impacted. The answers to these questions are of more than academic interest, not only to the millions of women who are in or who plan to enter these occupations but also to education and training institutions. These institutions must know the nature of tomorrow's jobs if they are to prepare tomorrow's work force.

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